CHARLES RIVER STUDY

COORDINATING COMMITTEE MEETING

5 MARCH 1969

STREAM CLASSIFICATION AND WATER QUALITY IMPROVEMENT

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On September 6, 1966, the Massachusetts Legislature enacted 4 bills which delineated the Massachusetts water pollution control program. Chapter 687 provided for a 150 million dollar state construction-grant program and a 1 million dollar-a-year research and development program, designed to develop new and improved waste treatment methods and to assist in the combined sewer discharge problem. Chapter 685 established the Division of Water Pollution Control under the Water Resources Commission in the Massachusetts Department of Natural Resources, with broad regulatory and administrative powers in the field of water pollution control. Chapters 700 and 701 provide for corporate and local tax incentive assistance to industries that install suitable industrial waste treatment facilities.

One of the responsibilities of the Division was to set water quality standards for the rivers and coastal waters of Massachusetts, to "protect the public health and enhance the quality of water". These standards were to be accompanied by a plan of implementation and enforcement.

In 1967 water quality standards were developed and all the waters of this state were classified according to anticipated use. A program has been set up by which pollutors are notified that they are in violation of the standards and must meet a time schedule which culminates with final construction of treatment facilities. The standards and implementation program were approved by the Massachusetts Water Resources Commission and subsequently by the Secretary of the Interior. As a result, Massachusetts municipalities are eligible for maximum Federal grants.

A combination of State and Federal grants can contribute up to 80 percent of the cost of construction of a municipal plant.

If a municipality will construct and operate a plant for one or more industries, this facility will also be eligible for State and Federal grants.

The Charles River was classified as B and C for most of its length. Except for bacteria there is little difference between the various characteristics of these two categories. These classifications apply not to present but future water quality.

Figure 1 shows the classification of the Charles River Basin.

A short stretch in Hopkinton and Milford is class A. Cedar Swamp Pond is class B. The main stem of the Charles River is class C from Cedar Swamp Pond to Bridge Street in Dover. From Dover to Watertown Dam

the river is class B and down stream of Watertown Dan the river is class C.

Table 1 lists the various parameters for which limits have been established.

Class A waters have the highest quality and may be used as public water supplies with minimum treatment.

Class B waters are suitable for bathing and also water supplies after appropriate treatment.

Class C waters are suitable for boating and fish habitat and have good aesthetic characteristics.

The known pollutors on the Charles River Basin are shown in Figure 2. Some of those listed have adequate facilities. Others are in various stages of their pollution abatement schedules.

Bettinger and Stylon discharge industrial wastes to Cedar Swamp Pond. New treatment facilities will be constructed by October 1969, for these industries.

Milford has a secondary trickling filter plant and chlorinates seasonally.

Unionville Woolen Mills has gone out of business.

Franklin will build a new plant. Because of the low dry weather flows in Mine Brook consideration is being given to locating the plant or the outfall closer to the Charles River.

Floral Development Corporation, Pope Industrial Park, Holliston. This plant discharges approximately 4000 gallons per day of wastes to Chicken Brook. They consist of dye, acids and ammonia. Subsurface disposal or equivalent secondary treatment is expected to be operational by December 1969.

Medway is scheduled to build a sewage treatment plant by April of 1972. Your Laundry has the same pollution abatement schedule as Medway.

Buckley and Mann, Norfolk. Wastes from this textile company consist of waste fiber, dyes, acid and dirt. These are treated in two lagoons which discharge into Mill Brook.

A new plant is completed at the Wrentham State School and will be in operation in the very near future.

Pondville Sanitorium. Wastes from this institution are discharged to Stop River after settling, sand filtration and seasonal chlorination.

A new plant for Norfolk and Walpole Prisons is in the design stage.

The Ruberoid Company and Cliquot Club discharge their industrial wastes to a small brook that flows by the Millis Sewage Treatment Plant. Ruberoid will install a treatment facility by October 1969. The schedule for Cliquot Club calls for pollution abatement by April of 1972.

Medfield. The Medfield Sewage Treatment Plant receives wastewater from about a thousand persons. Treatment consists of primary settling and sand filtration. Seasonal chlorination will commence in the Spring of 1969.

Medfield State Hospital. This institution treats its wastes with primary settling tanks and sand filters. Chlorination is seasonal.

St. Stevens School, Sherborn. This is a small source. Wastes are treated by septic tanks and sand filters.

Tillotson Rubber Company has diverted its wastes from Rosemary Brook to the MDC Sewer.

Pierce Brothers Oil Company which processes waste oil is seeking new methods of disposing of its wastes.

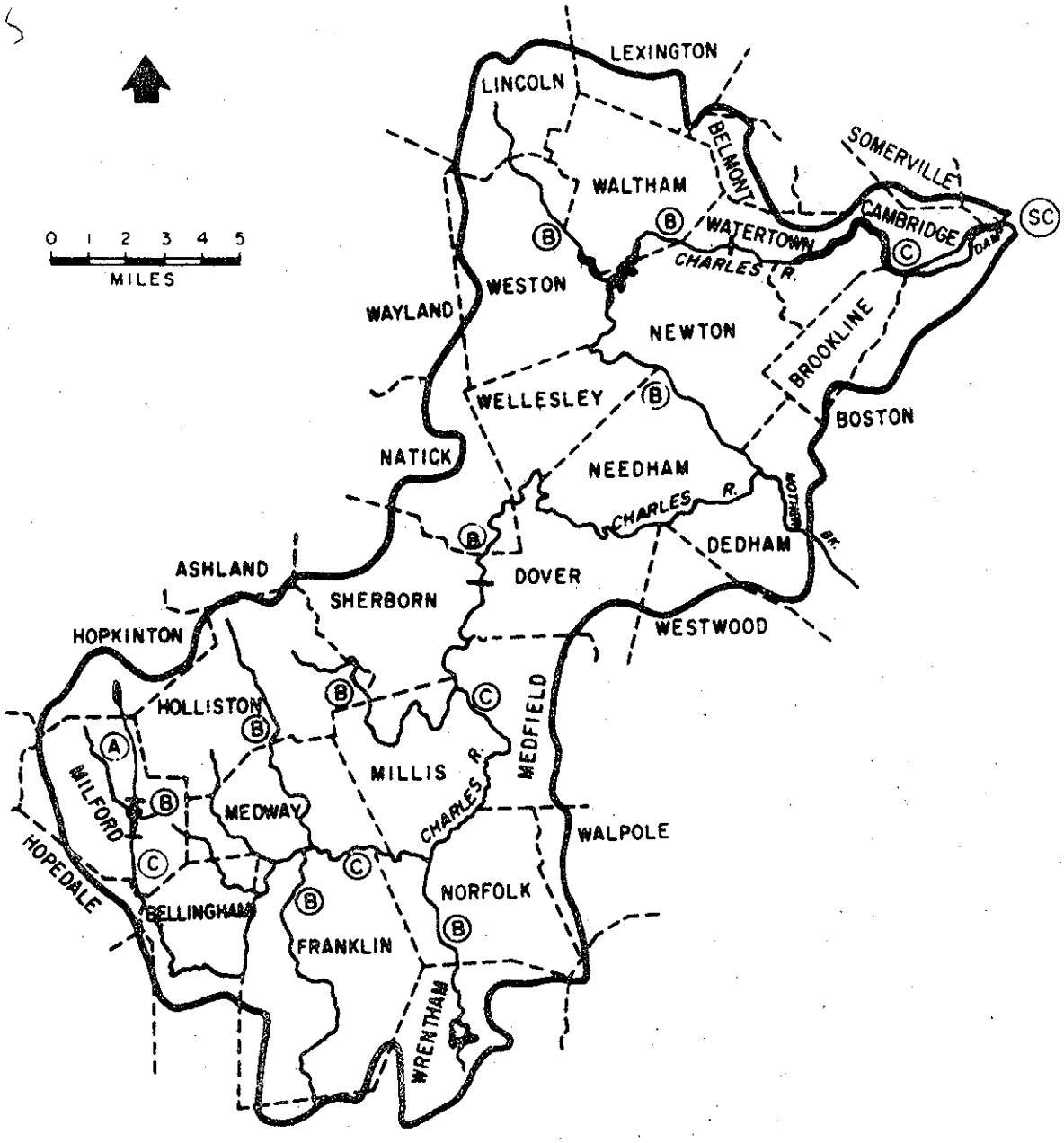
Penn Central Railroad near Boston University Bridge will install oil removal equipment to prevent oil pollution in the lower Charles River.

With the construction of new wastewater treatment plants, water quality upstream of Watertown Dam is expected to improve in the next few years.

Pollution in the Charles River downstream of Watertown Dam is caused primarily by combined sewer overflows and is complicated by the presence of salt water. It is hoped that water quality in this stretch of the

river, however, will be upgraded substantially with the completion of the combined sewer detention and chlorination facility and the construction of the new locks downstream of the Charles River Dam.

We are shooting for a high degree of treatment for each of the facilities discharging into the Charles River. Because of the great influence of algae to dissolved oxygen and nuisance conditions, it may be necessary in the future to require nutrient removal as well. Conventional treatment removes little of these. (Figures 3 and 4 show the effect of algae on dissolved oxygen.) Nutrient removal is expensive and must be balanced against such alternatives as low flow augmentation and discharge to the MDC sewerage system. These alternatives are being examined by the Corps of Engineers and the Federal Water Pollution Control Administration.



COMMONWEALTH OF MASSACHUSETTS
WATER RESOURCES COMMISSION

CHARLES RIVER BASIN

CLASSIFICATION

WATER USE CLASSES - (A) (B) (C) (D) (SB)

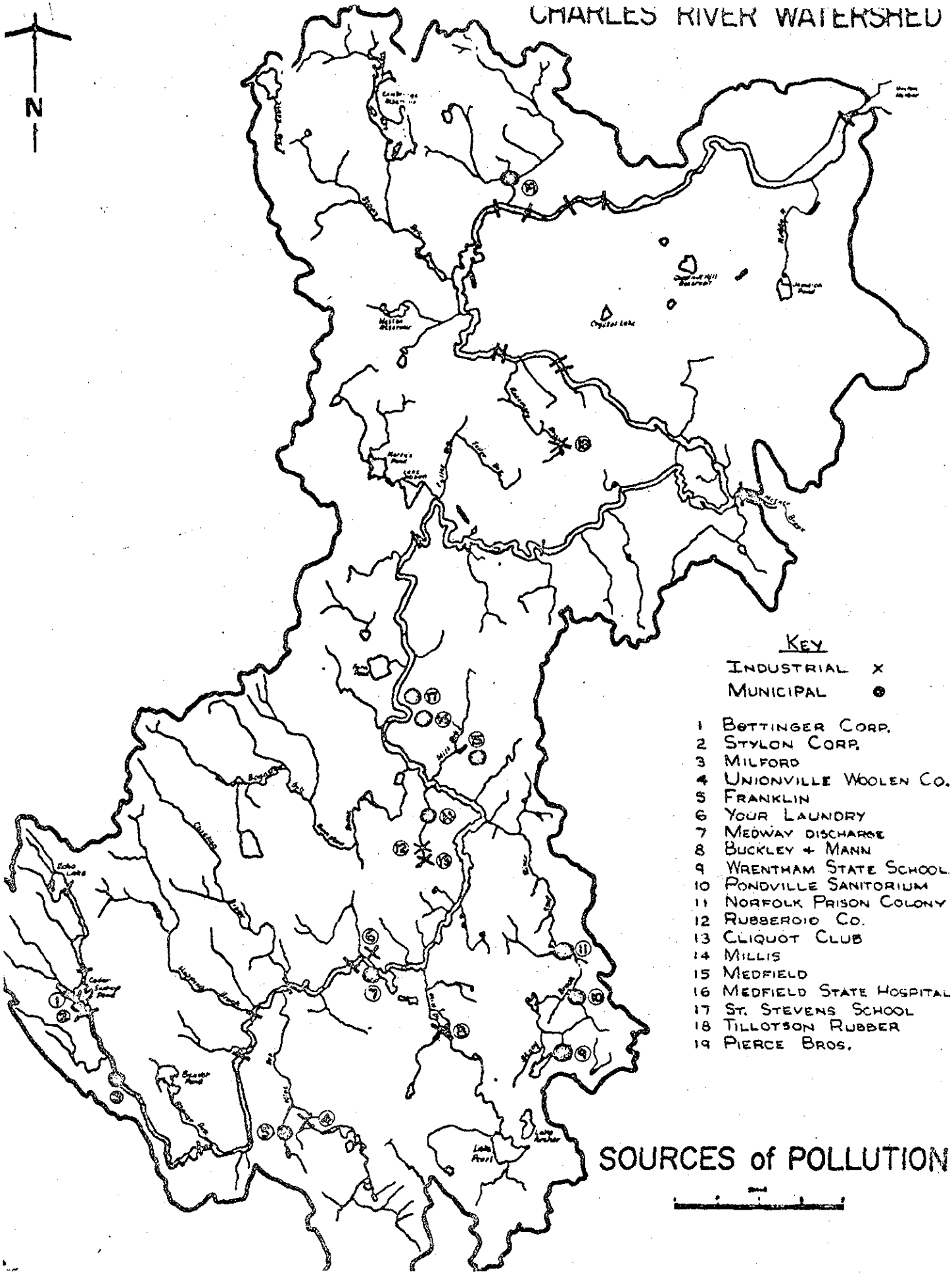
— CHANGE CLASSIFICATION

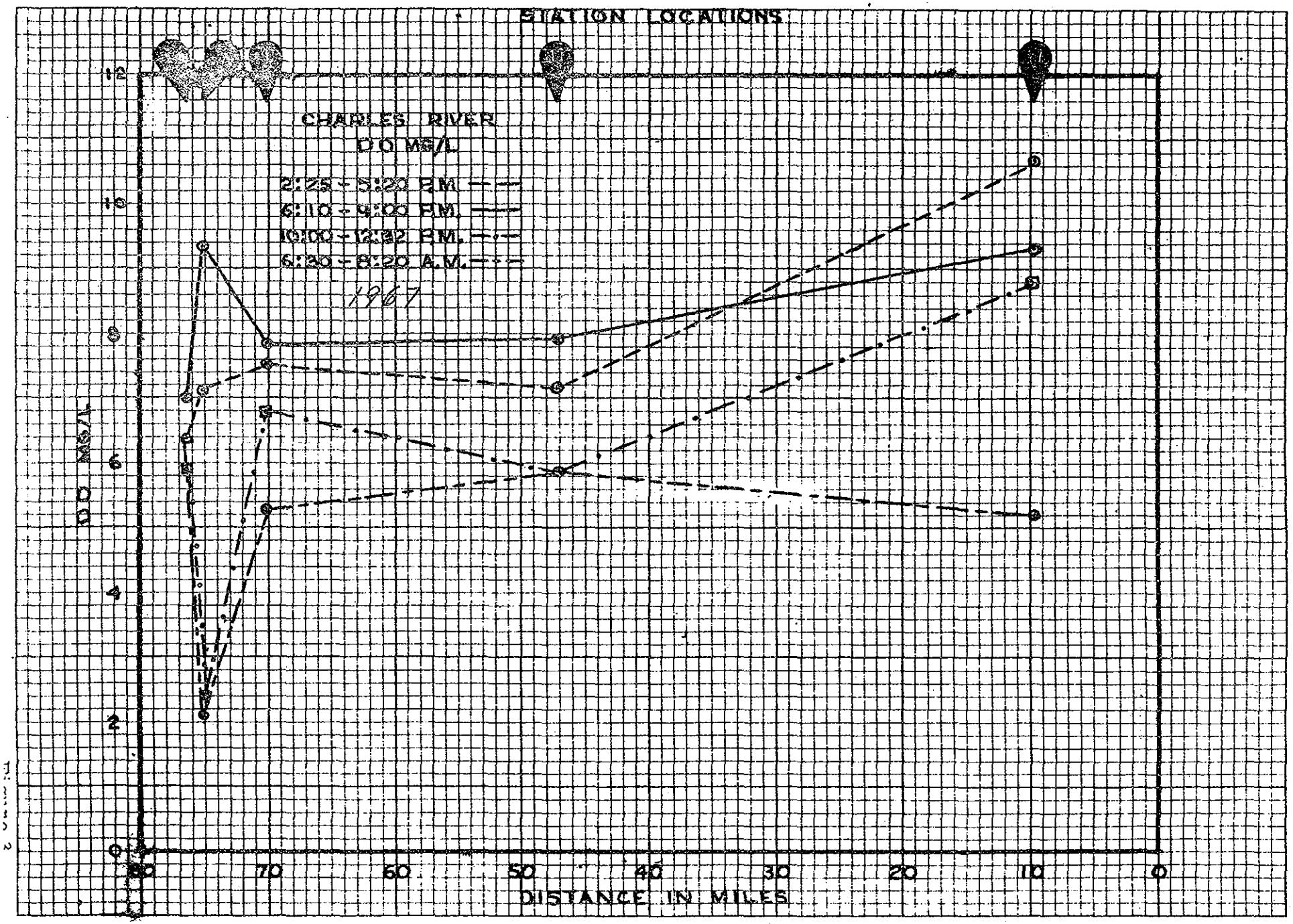
Figure 1

Commonwealth of Massachusetts
Water Resources Commission
Division of Water Pollution Control

CHARLES RIVER BASIN CLASSIFICATION

BOUNDARY	PRESENT USE	ANTICIPATED FUTURE USE	PRESENT CONDITION	CLASSIFICATION
The Charles River from its source to Dilla Street, Milford	Water Supply	Water Supply	A	A
The Charles River from Dilla Street, Milford to Main Street, Milford	Bathing Fish & Wildlife propagation Fishing	Same	B	B
The Charles River from Main Street Milford to Bridge Street, Dover	Recreational Boating Fish & Wildlife propagation Fishing Assimilation	Same	D & C	C
The Charles River from Bridge Street, Dover to Watertown Dam, Watertown	Recreational Boating Fish & Wildlife propagation Fishing Assimilation	Same and Bathing	D & C	B
The Charles River from Watertown Dam, Watertown to the Charles River Basin Dam in Boston	Recreational Boating Fish & Wildlife propagation Fishing Assimilation	Same	D & C	C
Medfield-Farm Pond, Sherborn	Water Supply	Water Supply	A	A
All other streams in the Charles River Watershed unless denoted above	—	—	-	B


CHARLES RIVER WATERSHED
N
KEY
INDUSTRIAL X
MUNICIPAL ⊙
1 BOTTINGER CORP.
2 STYLON CORP.
3 MILFORD
4 UNIONVILLE WOOLEN CO.
5 FRANKLIN
6 YOUR LAUNDRY
7 MEDWAY DISCHARGE
8 BUCKLEY + MANN
9 WRENTHAM STATE SCHOOL
10 PONDVILLE SANITORIUM
11 NORFOLK PRISON COLONY
12 RUBBEROID CO.
13 CLIQUOT CLUB
14 MILLIS
15 MEDFIELD
16 MEDFIELD STATE HOSPITAL
17 ST. STEVENS SCHOOL
18 TILLOTSON RUBBER
19 PIERCE BROS.
SOURCES of POLLUTION


STATION LOCATIONS
CHARLES RIVER
DO MG/L
2:25 - 5:20 P.M.
6:10 - 9:00 P.M.
10:00 - 12:32 P.M.
6:35 - 8:20 A.M.
1967
DO MG/L
12
10
8
6
4
2
0
80
70
60
50
40
30
20
10
0
DISTANCE IN MILES

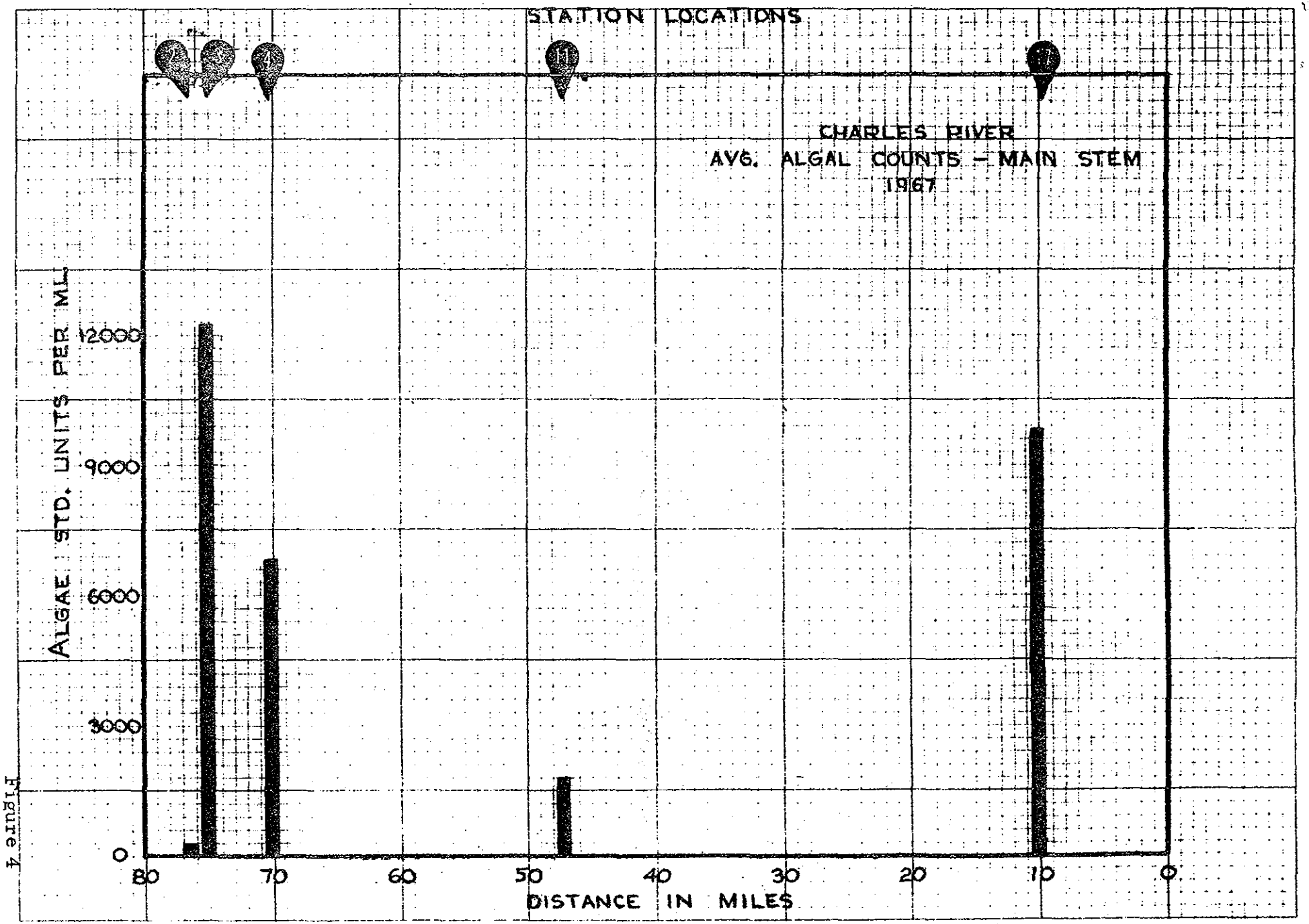

STATION LOCATIONS
2
3
4
11
7
CHARLES RIVER
AVG. ALGAL COUNTS – MAIN STEM
1967
ALGAE, STD. UNITS PER ML.
12000
9000
6000
3000
0
80
70
60
50
40
30
20
10
0
DISTANCE IN MILES

Figure 4

TABLE 1

SUMMARY OF WATER QUALITY STANDARDS

ITEM	INLAND WATERS				COASTAL WATERS		
	CLASS A	CLASS B	CLASS C	CLASS D	CLASS SA	CLASS SB	CLASS SC
DISSOLVED OXYGEN							
Minimum, mg/l	5.0	5.0	3.0 (2)	2.0	6.5	5.0	3.0 (2)
Percent Saturation (1)	75	75	-	-	-	-	-
COLIFORM BACTERIA							
Average value per 100 ml	50	1000	NONE (3)	NONE (3)	70	700	NONE (3)
pH (Min - Max)	(4)	6.5-8.0	6.0-8.5	6.0-9.0	6.8-8.5	6.8-8.5	6.5-8.5
TEMPERATURE, Deg. F							
Cold water fishery	(4)	68	68	-	-	-	-
Warm water fishery	(4)	83	83	90	-	-	-
Maximum increase	(4)	4	4		-	-	-
TOTAL PHOSPHATE, mg/l	-	0.05	0.05	-	0.07	0.07	0.07
AMMONIA, mg/l as N	-	0.5	1.0	-	0.2	0.2	1.0
PHENOLS, mg/l	-	0.001	0.002	-	-	-	-

(1) During 16 hours of a 24 hr period.
(2) Minimum of 5.0 mg/l during 16 hours of a 24 hr period.
(3) None in such concentrations that would impair uses assigned this class.
(4) As naturally occurs.

NOTE: The remaining criteria (solids, color and turbidity, taste and odor, chemical constitutents and radioactivity) have not been assigned limiting values. Allowable concentrations depend on most sensitive water use. The complete Water Quality Standards have been published and are available from the Division of Water Pollution Control, 100 Cambridge Street, Boston, Massachusetts.